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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/379,722	08/24/1999	CAMERON BOLITHO BROWNE	169.1418	1633

5514 7590 08/10/2004

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EXAMINER

HARRISON, CHANTE E

ART UNIT	PAPER NUMBER
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2672

DATE MAILED: 08/10/2004

25

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/379,722

Applicant(s)

BROWNE ET AL.

Examiner

Chante Harrison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29,32-60 and 63-91 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29,32-60 and 63-91 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. This action is responsive to communications: Amendment D, filed on 11/14/03.

This action is made ***FINAL***.

2. Claims 1-29, 32-60, 63-91 are pending in the case. Claims 1, 32 and 63 are independent claims. Claims 1, 32 and 63 have been amended.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7-12, 14-19, 21-26, 28-29, 33-36, 38-43, 45-50, 52-57, 59-60, 64-67, 69-74, 76-81, 83-88, and 90-91 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henry Moreton, U.S. Patent 5,636,338, 6/1997.

As per independent claim 1, Moreton discloses receiving the space curve (i.e. receiving specification of a curve and multiple constraints for designing networks of curves having torsion) (abstract; col. 1, ll. 5-10), the curve having two endpoints (col. 4, ll. 37-43; col. 12, ll. 14-15) and is adapted to have one of two directions, either a forward direction proceeding along the space curve from an initial endpoint to a terminating endpoint or a reverse direction proceeding along the space curve from the terminating endpoint to the initial endpoint (col. 8, ll. 25-45), selecting a desired direction (i.e. specifying a tangent constraint) (col. 5, ll. 60-67), generating a first vector (i.e. chord P_i to P_{i+1}) (Fig. 12) having a direction the same as the selected desired direction (col. 11, ll. 55-60), generating a second vector (i.e. chord P_i to P_{i-1}) (Fig. 12) having a corresponding direction representative of and derived from a corresponding

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characteristic of the space curve (col. 11, ll. 61-64; col. 8, ll. 60-65), determining based on a result of the comparison, a direction of the space curve (col. 8, ll. 60-65), wherein the determined direction of the space curve is one of two directions, either the forward or the reverse direction, that is closest in direction to the selected desired direction (col. 9, ll. 3-11; col. 11, ll. 23-25) and orientating the direction of the space curve to the determined direction (col. 9, ll. 1-3).

Moreton fails to specifically disclose comparing the first and second vectors. comparing the vectors, however it would have been obvious to one of skill in the art to incorporate comparing the first and second vectors with disclosure of Moreton because Moreton teaches the vectors sharing data structures that hold specified parameters, including tangents, for each vector to meet continuity for multiple parameters (col. 8, ll. 50-55, 60-65).

As per dependent claim 2, Moreton discloses determining space curve endpoints (col. 8, ll. 25-30, 50-55) and generating a second vector connecting the endpoints (col. 8, ll. 60-65).

As per dependent claim 3, Moreton discloses determining endpoints (col. 8, ll. 25-30, 50-55) and generating two-second vectors connecting the endpoints (col. 13, ll. 5-10), but fails to specifically disclose the each second vector having opposite directions. However it would have been obvious to one of ordinary skill in the art to incorporate each second vector having opposite directions with the disclosure of

Moreton because Moreton teaches initializing the tangent directions of endpoints of each curve in a network (col. 12, ll. 3-6).

As per dependent claim 4, Moreton discloses determining a first angle between one of the second vectors and the first vector (col. 8, ll. 53-58), determining a second angle between the other one of the second vectors and the first vector (col. 8, ll. 53-58), comparing the first angle with the second angle (col. 1, ll. 60-65), but fails to specifically disclose wherein if the first angle is less than the second angle then the determined direction of the space curve is in a first direction, and if the first angle is greater than the second angle then the determined direction of the space curve is in a second direction, opposite the first direction. It would have been obvious to incorporate determining the curve direction based on the magnitude of the angles associated with the vectors with the disclosure of Moreton because Moreton teaches varying the curve direction based on the angular difference between tangents of adjacent vector curve segments (col. 1, ll. 60-65) with the direction of the curve being varied (i.e. forward or reverse) by the magnitude of the angle (col. 1, ll. 60-65; col. 8, ll. 35-45).

As per dependent claim 5, Moreton discloses determining a first angle (col. 8, ll. 53-58), comparing the first angle with a first threshold value (col. 4, ll. 64-67), but fails to specifically disclose wherein if the first angle is less than the first threshold values then the determined direction of the space curve is in a first direction, and if the first angle is

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greater the first threshold value then the determined direction of the space curve is in a second direction, opposite the first direction. It would have been obvious to incorporate determining the curve direction based on the comparison of the angle with a threshold with the disclosure of Moreton because Moreton teaches varying the curve direction as a function of the curvature, which is based on angle separation and a limit determined by the angle separation (col. 4, ll. 60-65) with the direction of the curve being varied (i.e. forward or reverse) by the magnitude of the angle (col. 1, ll. 60-65; col. 8, ll. 35-45).

As per dependent claims 7, 8, 21, 22 Moreton discloses generating a vector orthogonal to the first vector (Fig. 3).

As per dependent claims 9, 23, Moreton discloses the orthogonal vector is generated in a predetermined manner (col. 4, ll. 58-64; Fig. 3).

As per dependent claims 10, 24, Moreton discloses the orthogonal vector is generated in accordance with a selected direction (col. 4, ll. 55-65; col. 12, ll. 5-6), but fails to specifically disclose a user selection. It would have been obvious to one of skill in the art to incorporate a user selected direction with the disclosure of Moreton because Moreton teaches providing specifications to computer aided design tools (col. 4, ll. 29-21).

As per dependent claim 11, similar rationale as applied to claim 4 applies herein as Moreton discloses angles (i.e. alpha, beta, gamma) specifying the parameterization at the endpoints (col. 11, ll. 25-30), with the direction of the curve being varied (i.e. forward or reverse) by the magnitude of the angle (col. 1, ll. 60-65; col. 8, ll. 35-45).

As per dependent claim 12, similar rationale as applied to claim 5 applies herein.

As per dependent claim 14, Moreton discloses determining endpoints (col. 8, ll. 25-30, 50-55) and generating second vector tangents for each endpoint (col. 12, ll. 3-6).

As per dependent claim 15, similar rationale as applied to claim 4 applies herein.

As per dependent claims 16 and 17, similar rationale as applied in the rejection of claims 2 and 3 apply herein as Moreton discloses generating one or multiple vectors in a network of curves (col. 12, ll. 1-20; col. 13, ll. 5-10).

As per dependent claim 18, similar rationale as applied to claim 4 applies herein as Moreton discloses angles (i.e. alpha, beta, gamma) specifying the parameterization at the endpoints (col. 11, ll. 25-30).

As per dependent claim 19, similar rationale as applied to claim 5 applies herein.

As per dependent claim 25, similar rationale as applied to claim 11 applies herein.

As per dependent claim 26, similar rationale as applied to claim 12 applies herein.

As per dependent claim 28, Moreton discloses providing further space curves (col. 13, ll. 5-10), and performing the step of generating a second vector (col. 8, ll. 60-65), comparing first and second vectors (col. 8, ll. 50-55, 60-65) and orientating the direction of each curve (col. 9, ll. 1-3).

As per dependent claim 29, Moreton discloses a plurality of techniques for generating the second vectors (i.e. specifying a level of continuity) (col. 1, ll. 27-30; col. 8, ll. 50-53, 60-65). Moreton fails to disclose selecting one of the techniques in response to user input. It would have been obvious to one of skill in the art to incorporate selection of a technique in response to user input with the disclosure of Moreton because Moreton teaches providing specifications to computer aided design tools (col. 4, ll. 29-21).

As per independent claim 32, Moreton discloses an apparatus (Fig. 6) for performing the method of claim 1. Therefore the rejection as applied to claim 1 is included herein.

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As per independent claim 63, Moreton discloses a program (col. 4, ll. 25-30) for performing the method of claim 1. Therefore the rejection as applied to claim 1 is included herein.

As per dependent claims 33-36, 38-43, 45-50, 52-57, 59-60, 64-67, 69-74, 76-81, 83-88, and 90-91, the rationale as applied to respectively corresponding claims 1-5, 7-12, 14-19, 21-26 and 28-29 apply herein.

Claims 6, 13, 20, 27, 37, 44, 51, 58, 68, 75, 82, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henry Moreton as applied to claims 1, 32 and 63 above and further in view of Rice et al., U.S. Patent 6,268,871.

As per dependent claims 6, 13, 20, 27, 37, 44, 51, 58, 68, 75, 82, and 89, Moreton fails to disclose the first threshold value is 90 degrees, which Rice discloses (Fig. 15; col. 11, ll. 55-65). It would have been obvious to one of skill in the art to incorporate Rice's disclosure of a 90 degree threshold with the teachings of Moreton because Moreton discloses designating constraint parameters that are compared to determine curve direction based on an angular threshold (col. 8, ll. 50-65; col. 1, ll. 60-65).

Response to Arguments

1. Applicant's arguments filed 5/17/04 have been fully considered but they are not persuasive.

Applicant argues (pp. 29, Para 1, 3; pp. 30) Moreton does not suggest determining which of two directions is closest to the desired direction.

In reply, Moreton teaches generating a network of curves, which is a collection of curves that share endpoints, and are specified by points, tangent directions and other curve characteristics through which the network must pass, (col. 2, ll. 38-42; col. 4, ll. 40-45). Moreton also teaches use of a particular space curve, Quintic Hermite, is best for satisfying continuity constraints on position, tangent direction, curvature and torsion (col. 7-8, ll. 64-2). Moreton further teaches that the curvature magnitude, m_i , affects the curve direction, such that the magnitude must be constrained to maintain the curvature vector in the positive direction, otherwise the curvature vector would reverse direction (col. 8, ll. 35-45). Additionally, Moreton discloses distributing the curvature information among the vertices and the elements such that specification of the geometries/curve characteristics at endpoints of a curve may result in adjacent curves having continuity when the data shared is the same or discontinuity when the data shared is not the same (col. 8, ll. 53-67). Thus, it is suggested that a curve may have either forward/positive or reverse/negative direction. Moreton also discloses using Quintic Hermite segments between constraints to accurately approximate the curve so that the desired curve

properties (e.g. the initially specified tangent direction, etc.) are represented (col. 9, ll. 1-11). By specifying the curve characteristics (e.g. tangent direction, torsion, etc.) at the endpoints and setting continuity constraints it is suggested that the closest tangent direction (e.g. forward or reverse) that meets the desired continuity constraint would be selected. Thus, Moreton teaches determining which of two directions, either the forward or the reverse direction, is closest to the desired direction.

Applicant argues (pp. 29, Para 2) Moreton does not disclose receiving the space curve.

In reply, Moreton teaches receiving user specification of a curve and multiple constraints for designing curves and networks of curves (abstract; col. 1, ll. 5-10). Moreton further discloses that the network of curves is a collection of curves that share endpoints (col. 4, ll. 40-45); and define a space curve when the scalar value torsion is a characteristic (col.4, ll.52-54). Moreton discloses that the shape specification of curve characteristics are transformed into a curve and subsequently displayed (col. 5, ll. 25-33). Thus, Moreton teaches receiving a space curve by receiving the specification of the space curve.

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

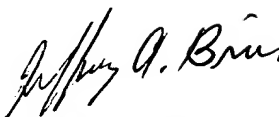
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chante Harrison whose telephone number is 703-305-3937. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on 703-305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chante Harrison
Examiner
Art Unit 2672

ceh


JEFFERY BRIAR
PRIMARY EXAMINER